AMENDMENTS TO THE CLAIMS:

Please amend claims 1, 2, 4, and 16-20 and add new claims 44 and 45 as shown on the following pages. Material inserted is indicated by underlining (insertion) and material deleted is indicated by strike-out (~~deletion~~).

1. (Currently Amended) ~~Method~~ A method for covalently immobilizing biopolymers on a solid phase comprising the steps of:

   (a) preparing a solid phase selected from metallic solid phases, oxidic solid phases and metallic-oxidic solid phases which contains groups on at least part of its surface which can react with amino groups and are selected from halogenide, aldehyde, and epoxide~~, isocyanate and isothiocyanate~~ groups,

   (b) preparing a biopolymer with a reactive amino group and

   (c) covalently immobilizing the biopolymer on the solid phase.

2. (Currently Amended) Method as claimed in claim 1, characterized in that the groups on the solid phase that can react with amino groups are selected from arylhalogenide, and aldehyde ~~and isocyanate~~ groups.

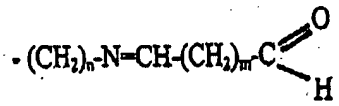
3. (Previously Presented) Method as claimed in claim 1, characterized in that the solid phase is selected from silicon, silicon dioxide, silicate glasses and silicon/silicon dioxide.

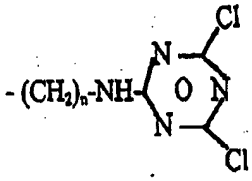
4. (Currently Amended) Method as claimed in claim 1, characterized in that the solid phase comprises a structure of the general formula (I):

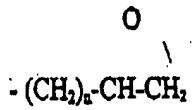
Z-R (I)

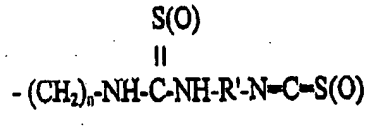
in which Z denotes silicon, silicon dioxide, a silicate glass or an oxidized silicon layer,

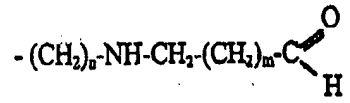
R denotes ~~$(CH_2)_n$-Cl~~ $\underline{(CH_2)_n\text{-Cl}}$











or

R' denotes an alkylene or arylene residue, in particular a 1,4 phenylene residue and n and m each denote a positive integer preferably from 1-20.

5. (Previously Presented) Method as claimed in claim 1, characterized in that the biopolymers are selected from nucleic acids and nucleic acid analogues.

6. (Original) Method as claimed in claim 5, characterized in that amino-modified nucleic acids or nucleic acid analogues having a structure of the general formula (II) are used

$$R^1\text{-NH-X-NA} \qquad \text{(II)}$$

in which

R^1 denotes hydrogen or a C_1-C_6 alkyl group,

NA denotes a nucleic acid in particular a DNA or an oligonucleotide, or a nucleic acid analogue,

X denotes a chemical bond or a linker group and X is linked to the 5' or/and 3' terminal building block of NA.

7. (Original) Method as claimed in claim 6, characterized in that NA is a nucleic acid and the group R1NH-X is linked to NA via the 5' C atom of the 5' terminal sugar residue which is in particular a deoxyribose residue.

8. (Previously Presented) Method as claimed in claim 6, characterized in that

X denotes = $(CH_2)_{n1}$- or $(CH_2)_{n1}$-O-P(=O)(OM)

in which

n1 denotes a positive integer or 0, in particular from 1 to 20 e.g. 3, 6 or 12 and

M denotes hydrogen or a cation.

9. (Currently Amended) ~~Method as claimed in claim 6 characterized in that~~ A method for covalently immobilizing biopolymers on a solid phase comprising the steps of:

(a) preparing a solid phase selected from metallic solid phases, oxidic solid phases and metallic-oxidic solid phases which contains groups on at least part of its surface which can react with amino groups and are selected from halogenide, aldehyde, epoxide, isocyanate and isothiocyanate groups,

(b) preparing a biopolymer with a reactive amino group and

(c) covalently immobilizing the biopolymer on the solid phase,

wherein the biopolymers are amino-modified nucleic acids or analogues thereof having a structure of the general formula (II) are used

$$R^1\text{-NH-X-NA} \qquad \text{(II)}$$

in which

R^1 denotes hydrogen or a C_1-C_6 alkyl group,

NA denotes a nucleic acid in particular a DNA or an oligonucleotide, or a nucleic acid analogue,

X denotes a chemical bond or a linker group and X is linked to the 5' or/and 3' terminal building block of NA,

and wherein the amino modified nucleic acids are produced by enzymatic synthesis and subsequent site specific cleavage at the amino group.

10. (Previously Presented) Method as claimed in claim 6, characterized in that after immobilization of the biopolymer the solid phase comprises a structure of the general formula (III):

$$Z\text{-}R^2\text{-}Y\text{-}X\text{-}NA$$

in which

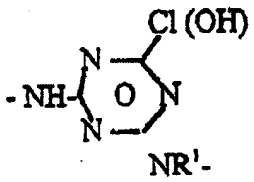
Z denotes a solid phase,

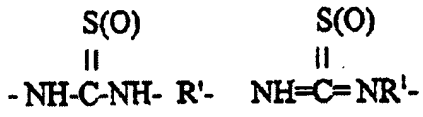
R^2 denotes $-(CH2)_{n2}-$,

Y denotes $-N=CH-(CH_2)_m-CH=N-$,

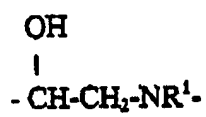
$-NH-CH_2-(CH_2)_m-CH_2-NR^1$,

$-NR^1$,





or



R', R^1, NA, and X are defined as in claim 6,

n2 denotes a positive integer or 0, in particular from 1 to 20 e.g. 1, 3, 6 or 12 and

m denotes a positive integer preferably from 1 to 20.

11. (Previously Presented) Method as claimed in claim 1, characterized in that biopolymers are applied to the solid phase in an array structure.

12. (Previously Presented) Method as claimed in claim 1, characterized in that the biopolymers are applied by microinjection pipettes.

13. (Original) Solid phase with immobilized biopolymers comprising a structure of the general formula (III) as defined in claim 10.

14. (Original) Solid phase as claimed in claim 13, characterized in that it contains an array structure with several different biopolymers each on separate surface areas.

15. (Previously Presented) Solid phase as claimed in claim 13, characterized in that the individual surface areas have a diameter of about 0.5 to 10μm.

16. (Currently Amended) ~~Use of a solid phase produced as claimed in claim 1 to examine~~ A method for examining the interactions between immobilized biopolymers and free biopolymers comprising the steps:

(a) immobilizing biopolymers on a solid phase according to claim 1

(b) contacting free biopolymers with the immobilized polymer

(c) detecting an interaction of the immobilized biopolymer with the free biopolymer.

17. (Currently Amended) ~~Use~~ The method as claimed in claim 16, characterized in that the free biopolymers are selected from nucleic acids, nucleic acid analogues, peptidic nucleic acids (PNA), peptides, polypeptides, lipids and carbohydrates.

18. (Currently Amended) ~~Use~~ The method as claimed in claim 16, characterized in that the immobilized biopolymers are selected from nucleic acids, nucleic acid analogues and PNA and wherein detecting an interaction with free biopolymers is based on hybridization.

19. (Currently Amended) ~~Use as claimed in claim 16~~ A method ~~for~~ of sequencing nucleic acids comprising examining interactions between immobilized biopolymers and free biopolymers according to claim 16 wherein

(a) the immobilized biopolymers are selected from nucleic acids, nucleic acid analogues and PNA;

(b) the free biopolymers are selected from nucleic acids, nucleic acid analogues, peptidic nucleic acids (PNA), peptides, polypeptides, lipids and carbohydrates;

(c) the immobilized biopolymers are arranged in any array or biochip; and detecting an interaction based on hybridization, and identifying the sequence of the free biopolymer by correlating the detected interaction with nucleic acid sequences.

20. (Currently amended) ~~Use as claimed in claim 16 for examining~~A method of determining the expression of genes, the function of genes and metabolism comprising examining

interactions between immobilized biopolymers and free biopolymers according to claim 16 wherein

(a) the immobilized biopolymers are selected from nucleic acids, nucleic acid analogues and PNA;

(b) the free biopolymers are selected from nucleic acids, nucleic acid analogues, peptidic nucleic acids (PNA), peptides, polypeptides, lipids and carbohydrates; and detecting an interaction based on hybridization; and correlating the detected interaction with gene expression.

21. (Withdrawn) Device for carrying out examination of hybridization-based interactions of immobilized and free biopolymers comprising a solid phase produced as claimed in claim 1 hybridization probe, a hybridization buffer and a hybridization chamber optionally connected to a pumping device and a temperature control device.

22. (Withdrawn) Use of the device as claimed in claim 21 in a method to detect the binding of hybridization probes to immobilized biopolymers.

23. (Withdrawn) Use as claimed in claim 22 comprising the detachment of bound hybridization probes from the solid phase and the use of the device for further hybridization cycles.

24. (Withdrawn) Use as claimed in claim 22,

characterized in that

hybridization probes are used which contain 5' amino-modified nucleotide building blocks.

25. (Withdrawn) Use as claimed in claim 24,

characterized in that

bound hybridization probes are subjected to a site-specific cleavage at the P-N bond of the 5' amino-modified nucleotide building blocks and are then detached from the biopolymers immobilized on the solid phase.

26. (Withdrawn) Method for simultaneous amplification and labeling of cDNA molecules comprising the steps:

(a) preparing RNA molecules,

(b) reversely transcribing the RNA molecules without introducing market groups into the resulting cDNA molecules,

(c) simultaneously labelling and amplifying the cDNA molecules using labelled deoxyribonucleoside triphosphates and

(d) optionally purifying the resulting labelled cDNA molecules.

27. (Withdrawn) Method as claimed in claim 26,

characterized in that

the RNA molecules prepared in step (a) contain a population of different RNA molecules,

e.g., total RNA, mRNA or other RNA fractions from a biological sample.

28. (Withdrawn) Method as claimed in claim 26,

characterized in that

deoxyribonucleoside triphosphates labeled with fluorescent groups which are preferably selected from fluorescein, CY3 and CY5 are used in step (c).

29. (Withdrawn) Method as claimed in claim 26,

characterized in that

5' amino-modified nucleotide building blocks are incorporated into the cDNA molecules during the amplification.

30. (Withdrawn) Method as claimed in claim 26,

characterized in that

at least one of the primers used for the amplification in step (c) is a 5' amino-modified primer.

31. (Withdrawn) Method for immobilizing biopolymers on a solid phase comprising the steps:

(a) preparing a solid phase selected from metallic solid phases, oxidic solid phases and metallic-oxidic solid phases which contains amino groups on at least part of its surface,

(b) preparing a biopolymer and

(c) immobilizing the biopolymer on the solid phase during which the sold phase containing amino groups forms stable covalent or non-covalent interactions with the biopolymer.

32. (Withdrawn) Method as claimed in claim 31,

characterized in that

the amino groups of the solid phase are produced by treating the sold phase surface with an aminosilyl compound.

33. (Withdrawn) Method as claimed in claim 32,

characterized in that

the aminosilyl compound has a structure of the general formula IV:

$$(R^1O)_3Si\text{-}(CH_2)_nNH\text{-}(CH2)_mNH_2 \qquad (IV)$$

in which R_1 denotes hydrogen or a C_1-C_3 alkyl group, preferably a methyl residue and n and m are defined as in claim 4.

34. (Withdrawn) Method as claimed in claim 33,

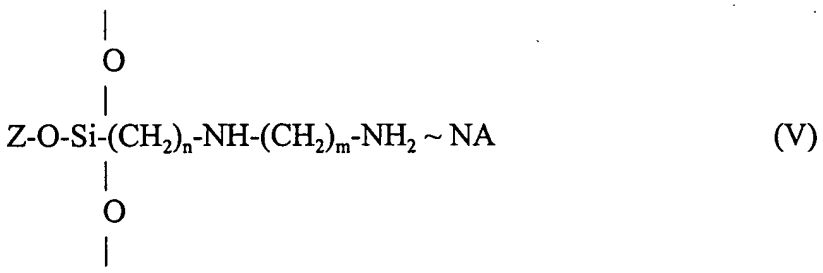
characterized in that

N-(6-aminohexyl)-aminopropyltrimethoxysilane is used as the compound of formula IV.

35. (Withdrawn) Method as claimed in claim 31,

characterized in that

after immobilization of the biopolymer the solid phase comprises a structure of the general formula (V):



(V)

in which NA, Z, n and m represents a covalent or non-covalent interaction.

36. (Withdrawn) Method as claimed in claim 31,

characterized in that

the biopolymers are applied to the solid phase in an array structure.

37. (Withdrawn) Method as claimed in claim 31,

characterized in that

the biopolymers are applied by microinjection pipettes.

38. (Withdrawn) Solid phase with immobilized biopolymers comprising a structure of the general formula (V) as defined in claim 35.

39. (Withdrawn) Solid phase as claimed in claim 38,

characterized in that

it contains an array of structure with several different biopolymers each on separate

surface areas.

40. (Withdrawn) Solid phase as claimed in claim 38,

characterized in that

the individual surface areas have a diameter of about 0.5 to 10 μm.

41. (Withdrawn) Method for separating double-stranded nucleic acids due to their base sequence,

characterized in that

one of the nucleic acid strands forming the double-stranded nucleic acid fragments contains at least one 5' amino-modified nucleotide building block.

42. (Withdrawn) Method as claimed in claim 41,

characterized in that

the separation comprises a partial melting of the nucleic acid double-strands by a temperature gradient.

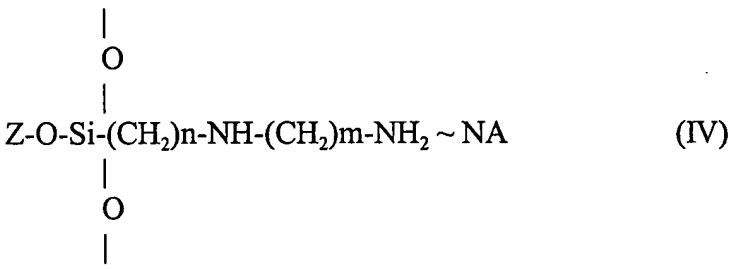
43. (Withdrawn) Method as claimed in claim 41 for mutation analysis.

44. (Withdrawn) Use of a solid phase produced as claimed in claim 13 to examine interactions between the immobilized biopolymers and free biopolymers.

45. (Withdrawn) Device for carrying out examinations of hybridization-based interaction of immobilized and free biopolymers comprising a solid phase produced as a solid phase as claimed in claim 14, at least one labeled hybridization probe, a hybridization buffer and a hybridization chamber optionally connected to a pumping device and a temperature control device.

46. (Withdrawn) Method as characterized in that

after immobilization of the biopolymer the solid phase comprises a structure of the general formula (V):



$$Z\text{-}O\text{-}Si\text{-}(CH_2)n\text{-}NH\text{-}(CH_2)m\text{-}NH_2 \sim NA \qquad (IV)$$

in which NA, Z, n and m are defined as claimed in claim 10 and ~ represents a covalent or non-covalent interaction.

47. (New) A method of determining the function of genes comprising examining interactions between immobilized biopolymers and free biopolymers according to claim 16, and correlating the interaction of the free biopolymer and an immobilized biopolymer with the function of a gene.

48. (New) A method of determining metabolism comprising examining the interactions

between immobilized biopolymers and free biopolymers according to claim 16, and correlating the interaction with metabolism.

Reconsideration and favorable action are earnestly requested.

RESPECTFULLY SUBMITTED,					
NAME AND REG. NUMBER	Willem F.C. de Weerd, Registration No. 51,613				
SIGNATURE		DATE	7-6-04		
Address	Rothwell, Figg, Ernst & Manbeck 1425 K Street, N.W., Suite 800				
City	Washington	*State*	D.C.	*Zip Code*	20005
Country	U.S.A.	*Telephone*	202-783-6040	*Fax*	202-783-6031

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